



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/703,202	10/31/2000	Steve J. Shattil	WIM 00 1	3524
7590	06/30/2005		EXAMINER LEUNG, CHRISTINA Y	
Steve J. Shattil 4980 Meredith Way #201 Boulder, CO 80303			ART UNIT 2633	PAPER NUMBER

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/703,202

Applicant(s)

SHATTIL, STEVE J.

Examiner

Christina Y. Leung

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-123 is/are pending in the application.
- 4a) Of the above claim(s) 1-4, 9-11, 13-15, 17, 19-48 and 65-123 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-8, 16, 18 and 49-64 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Group II, Embodiment 1, corresponding to claims 5-8, 16, 18, and 49-64 in the reply filed on 07 April 2005 is acknowledged. Because Applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 1-4, 9-15, 17, 19-48, and 65-123 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 07 April 2005 (see comment above).

### *Drawings*

3. The drawings are objected to because elements in the figures should have descriptive as well as numeric labels. In particular, Figures 1, 2, 3H, 10, 11A, 13, 14A-E, 15, 17A-B, and 28A contain elements that are currently only represented by blank boxes; such elements should have descriptive labels so that they may be readily understood in the art.
4. The drawings are also objected to because:  
  
Applicant's specification on page 28 describes elements in Figure 3A such as "composite signal 130," "phase spaces 123, 125, 127, and 129," and "time intervals 133, 135, and 137," but none of these numeric labels appear in Figure 3A.  
  
The element labeled "104" in Figure 6A should be labeled "114" instead (see specification on page 24).

Art Unit: 2633

The element labeled “221” in Figure 13 should be labeled “201” instead (see specification on page 38).

The elements labeled “210” in Figures 14B and 14C should be labeled “201” instead (see specification on page 40).

The elements labeled “212A” and “212B” in Figure 14E should be labeled “215A” and “215B” respectively instead (see specification on page 42).

The element labeled “158” in Figure 15 should be labeled “151” (see specification on page 42).

5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Art Unit: 2633

***Allowable Subject Matter***

6. The indicated allowability of claims 5-8, 16, and 18 is withdrawn in view of the newly discovered reference(s) to Piehler et al. (US 5,940,196 A), Kondo et al. (US 5,541,937 A), Raleigh et al. (US 6,144,711 A), and Vanoli et al. (US 5,712,716 A). Rejections based on the newly cited reference(s) follow.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 5, 6, 8, 16, 18, 49, and 54 are rejected under 35 U.S.C. 102(e) as being anticipated by Piehler et al. (US 5,940,196 A).

Regarding claim 5, Piehler et al. disclose a receiver system for a waveguide communication system (Figures 8A and 8B) including:

a multicarrier phase adjuster (including WDM demultiplexer 244 and phase delay elements 250 and 252) capable of providing phase adjustment to received multicarrier signals (column 5, lines 28-42; column 8, lines 26-53),

a combiner (RF combiner 266 in Figure 8A or WDM multiplexer 274 in Figure 8B) capable of combining the phase-adjusted multi-carrier signals, and

Art Unit: 2633

a time-domain receiver capable of processing the combined signals (specifically, the RF signal processing circuitry that receives the “RF out” signal and not explicitly shown in Figures 8A or 8B; Examiner notes that optical to electrical converter element 280 in Figure 8B may also be considered a receiver capable of processing the combined signals as recited in this claim).

Regarding claim 6, Piehler et al. disclose the multicarrier phase adjuster includes an optical-to-RF converter (such as optical to electrical converter elements 254 and 256 in Figure 8A; or optical to electrical converter element 280 in Figure 8B, whereby the time-domain receiver is the RF signal processing circuitry that receives the “RF out” signal that is not explicitly shown in Figures 8A or 8B).

Regarding claim 8, Piehler et al. disclose that the multicarrier phase adjuster is capable of providing a zero-phase relationship to the received signals (column 3, lines 1-9; column 4, lines 30-66).

Regarding claim 16, as similarly discussed above with regard to claim 5, Piehler et al. disclose a method of providing for reception of a plurality of redundantly modulated multicarrier signals (Figures 8A and 8B) including:

providing for adjustment of the phase of a plurality of the multicarrier signals received from a communication channel to provide at least one predetermined phase relationship (using phase delay elements 250 and 252),

providing for combining of the phase-adjusted received signals to provide at least one time-domain signal (using RF combiner 266 in Figure 8A or WDM multiplexer 274 in Figure 8B), and

Art Unit: 2633

providing for processing of the time-domain signal(s) in a time-domain receiver to detect at least one information signal modulated on the multicarrier signals (using the RF signal processing circuitry that receives the “RF out” signal and not explicitly shown in Figures 8A or 8B; Examiner notes that Piehler et al. disclose that the system may be used in a CATV transmission system, for example, whereby the “RF out” signal would be eventually processed/displayed; column 1, lines 11-26).

Examiner notes that the signals disclosed by Piehler et al. are redundantly modulated multicarrier signals (column 2, lines 16-24).

Regarding claim 18, as similarly discussed above with regard to claims 5 and 16, Piehler et al. disclose a multi phase-space detector capable of detecting a plurality of information signals modulated into a plurality of signal phase-spaces (Figures 8A and 8B), the detector including:

a coupler (specifically, the connection coupling WDM demultiplexer 244 to fiber 242) coupled to a communication channel (fiber 242) capable of coupling a plurality of transmitted signals out of the channel, the coupler providing a plurality of coupled signals having at least one distributed frequency characteristic,

a frequency sampler (WDM demultiplexer 244) capable of receiving the coupled signals and separating the coupled signals into a plurality of frequency components,

a phase processor (including phase delay elements 250 and 252) capable of receiving the frequency components and applying a plurality of phase adjustments to the frequency components, and

Art Unit: 2633

a combining circuit (RF combiner 266 in Figure 8A or WDM multiplexer 274 in Figure 8B) capable of combining the plurality of phase-adjusted frequency components to generate the plurality of information signals.

Regarding claim 49, Piehler et al. disclose that at least one of providing for adjustment and providing for combining includes separating the multicarrier signal into a plurality of carrier frequency components (using WDM demultiplexer 244).

Regarding claim 54, Piehler et al. disclose that at least one of providing for adjustment and providing for combining are adapted to compensate for channel distortion (column .2, lines 31-41).

9. Claims 16 and 49-56 are rejected under 35 U.S.C. 102(b) as being anticipated by Kondo et al. (US 5,521,937 A).

Regarding claim 16, Kondo et al. disclose a method of providing for reception of a plurality of redundantly modulated multicarrier signals (Figure 3) including:

providing for adjustment of the phase of a plurality of the multicarrier signals received from a communication channel to provide at least one predetermined phase relationship (using elements including integrators 45-47),

providing for combining of the phase-adjusted received signals to provide at least one time-domain signal (using combiner 51), and

providing for processing of the time-domain signal(s) in a time-domain receiver to detect at least one information signal modulated on the multicarrier signals (column 6, lines 22-36).



Regarding claim 49, Kondo et al. discloses that at least one of providing for adjustment and providing for combining includes separating the multicarrier signal into a plurality of carrier frequency components (column 6, lines 22-65).

Regarding claim 50, Kondo et al. disclose that providing for adjustment includes sampling the multicarrier signals (using integrators 45-47).

Regarding claim 51, Kondo et al. disclose that the redundantly modulated multicarrier signals are a DS-CDMA signal (column 1, lines 8-15).

Regarding claim 52, Kondo et al. disclose that providing for adjustment and providing for combining may be implemented with a matched filter (Kondo et al. disclose matched filters as an alternative embodiment not shown in Figure 3; column 7, lines 16-28).

Regarding claim 53, Kondo et al. disclose that providing for adjustment and providing for combining are adapted to project the redundantly modulated multicarrier signals onto at least one orthonormal basis (column 6, lines 17-21).

Regarding claim 54, Kondo et al. disclose that at least one of providing for adjustment and providing for combining are adapted to compensate for channel distortion (column 4, lines 49-67; column 5, lines 1-5).

Regarding claim 55, Kondo et al. disclose that providing for combining includes performing at least one of a set of combining processes, including maximal-ratio combining (column 7, lines 36-47).

Regarding claim 56, Kondo et al. disclose that at least one of providing for adjustment of the phase, providing for combining, and providing for processing of the time-domain signal(s) is

Art Unit: 2633

implemented digitally (Kondo et al. disclose using matched filters in a digital signal processor; column 7, lines 19-21).

10. Claims 18 and 57-64 are rejected under 35 U.S.C. 102(e) as being anticipated by Raleigh et al. (US 6,144,711 A).

Regarding claim 18, Raleigh et al. disclose a multi phase-space detector capable of detecting a plurality of information signals modulated into a plurality of signal phase-spaces (Figures 3, 8, and 12), the detector including:

a coupler (including "Receive Antennas" shown in Figure 12) coupled to a communication channel capable of coupling a plurality of transmitted signals out of the channel, the coupler providing a plurality of coupled signals having at least one distributed frequency characteristic,

a frequency sampler capable of receiving the coupled signals and separating the coupled signals into a plurality of frequency components (column 8, lines 34-67; column 9, lines 1-7; column 13, lines 24-65) ,

a phase processor capable of receiving the frequency components and applying a plurality of phase adjustments to the frequency components (column 13, lines 24-36), and

a combining circuit capable of combining the plurality of phase-adjusted frequency components to generate the plurality of information signals (including receiver spatial processor 240 in Figure 12, for example).

Regarding claim 57, Raleigh et al. disclose that the coupler includes an antenna array (i.e., "Receive Antennas" shown in Figure 12).

Art Unit: 2633

Regarding claim 58, Raleigh et al. disclose that the frequency sampler is implemented with a filter bank (column 6, lines 34-38 and lines 51-56).

Regarding claim 59, Raleigh et al. disclose that the frequency sampler includes a signal processor adapted to perform at least one Fourier transform (column 6, lines 33-35; column 14, lines 1-56).

Regarding claim 60, Raleigh et al. disclose that the phase processor includes a decoder (Figure 3 shows decoder 150).

Regarding claim 61, Raleigh et al. disclose that the phase processor is adapted to perform at least one N-point invertible transform (column 13, lines 38-67; column 14, lines 1-13).

Regarding claim 62, Raleigh et al. disclose that the combining circuit includes at least one decision module adapted to perform at least one of multi-user detection and multi-channel detection (Figure 22; column 23, lines 3-53).

Regarding claim 63, Raleigh et al. disclose that the combining circuit is adapted to perform at least one of a set of combining processes, including co-phasing, selective combining, maximal-ratio combining, equal-gain combining, and maximal-selection combining (in receiver spatial processor 240 shown in Figures 12, 14, and 16).

Regarding claim 64, Raleigh et al. disclose that at least one of the frequency sampler, the phase processor, and the combining circuit are implemented with a digital signal processor (column 7, lines 54-65).

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2633

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 7 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piehler et al. in view of Vanoli et al. (US 5,712,716 A).

Regarding claims 7 and 58, Piehler et al. disclose a system as discussed above with regard to claims 5 and 18 respectively. Piehler et al. that the multicarrier phase adjuster includes a WDM demultiplexer 244 (i.e., a frequency sampler as recited in claim 18) capable of separating the received multicarrier components with respect to frequency, but they do not explicitly disclose a filter bank. However, Vanoli et al. teach that a WDM demultiplexer such as already disclosed by Piehler et al. may be implemented as a filter bank (Figure 1 shows filter 11a-d). Regarding claims 7 and 58, it would have been obvious to a person of ordinary skill in the art to include a filter bank as taught by Vanoli et al. in the system disclosed by Piehler et al. in order to implement the wavelength separating/demultiplexing functions already disclosed.

### ***Conclusion***


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 571-272-3023. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306 until July 15, 2005; on or after July 15, 2005, the fax number is 571-273-8300.

Art Unit: 2633

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
JASON CHAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600